Storm Water Association of Maryland

COMMENTS OF THE
STORM WATER ASSOCIATION OF MARYLAND, INC.
REGARDING U.S. EPA'S DRAFT CHESAPEAKE BAY TMDL AND
MARYLAND'S DRAFT CHESAPEAKE BAY TMDL WIP

NOVEMBER 5, 2010

I. INTRODUCTION

On September 1, 2010, the State of Maryland ("State" or "Maryland") issued a Phase I Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load ("Draft WIP").[1] On September 22, 2010, the United States Environmental Protection Agency ("EPA") issued a notice of availability and request for public review and comment in the *Federal Register* regarding the development of a total maximum daily load for the Chesapeake Bay Watershed. On September 24, 2010, EPA issued a Draft Chesapeake Bay Total Maximum Daily Load ("Draft TMDL").

The Storm Water Association of Maryland ("SWAM") hereby submits the following comments in response to the EPA's *Federal Register* Notice and Draft TMDL and Maryland's Draft WIP. SWAM is a nonprofit association of local governments that proactively manage municipal separate storm sewer systems ("MS4s"). SWAM also includes leading engineering consulting in the field of stormwater management. SWAM members' MS4s discharge within the Chesapeake Bay watershed and thus SWAM members have a strong interest in the development of the Bay TMDL and WIP.

SWAM is concerned that the proposed retrofit/restoration requirements for urban stormwater to be imposed upon localities through EPA's TMDL and Maryland's WIP may result in unaffordable or otherwise unattainable legal requirements. As explained in greater detail below, costs for urban stormwater controls on roughly the levels we understand to be proposed in the Draft TMDL and Draft WIP may cost on the order of ***$700 to nearly $1,800 per household per year*** according to the recent analysis by a national engineering firm. We enclose a Technical Memorandum setting forth this analysis for your consideration. SWAM requests that EPA and the State address this issue and the others presented below before finalizing the TMDL and WIP.

II. DISCUSSION

In the Draft WIP, the State has proposed three options for Phase I MS4 permittees. Option 1 would require that all Phase I MS4s retrofit/restore 30% of existing untreated impervious area by 2017. Option 2 would increase the retrofit/restoration percentage to 40%. Option 3 would

[1] On September 24, 2010, Maryland issued a corrected Draft WIP.

increase the percentage to 50%.[2] If the 2017 goal is not met, the WIP indicates that these percentages would increase to 60% or even 70%:

> If the strategies fall short of the 2017 goal, increase MS4 permit requirements for MD's largest counties and the State Highway Administration to require installation of stormwater controls on 40% or 50% of their impervious surface by 2017 in their jurisdictions that do not already have stormwater controls. The 2020 goal would increase to 60% or 70%, respectively, depending on the option selected.[3]

Likewise, the Draft WIP proposes to establish a mandatory 20% retrofit/restoration requirement for all Phase II localities.[4] There are no alternative options presented for Phase II communities.

In the Draft TMDL, EPA has largely adopted Maryland's Draft WIP approach. EPA has established what it is calling "minor-level backstops" for Maryland. This means that EPA has made minor adjustments to Maryland's nonpoint source ("NPS") allocations, but has made "[n]o changes to point source wasteload allocations that would affect NPDES permit conditions."[5] For purposes of urban stormwater, EPA explains that:

> Maryland's draft Phase I WIP provides that 50 percent of the state's urban acres developed before 1985 in Phase I MS4 jurisdictions will be redeveloped or retrofit by 2020 to a 25% stormwater efficiency. Forty percent of the state's urban areas developed before 1985 in Phase II MS4 jurisdictions and smaller, non-MS4 areas will be redeveloped or retrofit by 2020 to a 25 percent stormwater efficiency. If those retrofit and redevelopment requirements are not sufficient to have practices in place by 2020 to meet Maryland's stormwater WLAs, EPA assumes that Maryland will increase these retrofit and redevelopment requirements accordingly.[6]

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[2] Draft WIP at ES-15; 5-23.

[3] Draft WIP at 5-23.

[4] Draft WIP at ES-15; 5-24.

[5] Draft TMDL ES-8; 8-13.

[6] Draft TMDL at 8-13. SWAM disagrees with the implication that MS4s are required to comply with WLAs or any other stated assumptions in a TMDL such as impervious area retrofit/restoration percentages. Section 402(p)(3) of the Clean Water Act provides that MS4s are to comply with the MEP performance standard ("Permits for discharges from municipal storm sewers-…(iii) shall require controls to reduce the discharge of pollutants to the **maximum extent practicable**…") (emphasis added). This requirement operates in lieu of strict compliance with TMDL WLAs and other provisions of a TMDL. The final TMDL and WIP should incorporate the MEP standard for clarity on this point and consistency with the operative provision of the Clean Water Act.

SWAM disagrees with EPA's and the State's approaches in that cost simply has not been reasonably considered or factored into the TMDL and WIP.

As both agencies are aware, local governments continue to suffer with tightening local budgets and reduced revenues. According to an October, 2010 Research Brief from the National League of Cities ("NLC"), "Local and regional economies characterized by struggling housing markets, slow consumer spending, and high levels of unemployment are driving declines in city revenues." The October brief shows that concerns over local fiscal health remain at the highest level in the 25 year history of the survey. Two of the major issues plaguing cities are declines in personal property and sales tax. As a result, NLC concludes that:

> 2010 reflects a number of downward trends for city fiscal conditions. The impacts of the economic downturn are becoming increasingly evident in city projections for final 2010 revenues and expenditures, and in the actions taken in response to changing conditions. The local sector of the economy is now fully [sic] the midst of a downturn that will be several years in length. The effects of a depressed real estate market, low levels of consumer confidence, and high levels of unemployment will likely play out in cities through 2010, 2011, and beyond.[7]

The National Association of Counties also conducted a survey of sample counties across the United States in June 2010 ("How Are Counties Doing? An Economic Status Survey"). According to the Executive Summary: "This survey reveals that the downturn continues to be widespread with counties of all sizes feeling the crunch from many directions." Furthermore, "[c]ounties report that they are using furloughs, layoffs and service curtailment to help reduce budgets that in many cases remain problematic because of continuing shortfalls."

In short, Maryland's local governments are in no position to fund an expensive and mandatory restoration/retrofit program that must be completed within the next nine years. Of course, this begs the question: How much would it cost to implement EPA's and Maryland's urban restoration/retrofit proposal?

SWAM submits for consideration by EPA and the State the attached Technical Memo by a national engineering firm with expertise in stormwater management. The Technical Memo estimates urban stormwater costs for Bay TMDL implementation on an annual per household cost basis. For a level of effort that approximates that of the Draft TMDL and Draft WIP, the analysis developed cost estimates to restore 50% of existing untreated impervious area over a 15 year term (the period required by EPA in its Draft TMDL). ***The result was an annual per household from a low of $678 per year in 2011 to a high of $1,717 in 2025.***[8]

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[7] October Research Brief at 7 (available online at http://www.nlc.org/ASSETS/AE26793318A645C795C9CD11DAB3B39B/RB_CityFiscalConditions2010.pdf).

[8] Technical Memorandum: Stormwater Retrofit Cost Estimate Case Study (October 12, 2010) (attached as Appendix 1 hereto).

The Technical Memo's cost estimate is only for urban retrofits; it does not include costs for stormwater management in unregulated areas or to pay for other costs associated with existing MS4 programs. Thus, total stormwater management cost increases would presumably be considerably higher factoring in increasing requirements of MS4 permits, costs of implementing other TMDLs beyond the Bay TMDL, and generally increasing liability for infrastructure renewal.

Elsewhere, EPA has estimated that the cost for urban stormwater control may be ***$7.9 billion per year*** for the Bay TMDL watershed.[9]

The nationally-recognized Center for Watershed Protection has estimated urban retrofit costs at on the order of ***$88,000 per acre.***[10]

SWAM respectfully submits that the Draft TMDL and Draft WIP do not address these major cost issues in a reasonable manner.

For these reasons, at this time, SWAM finds unreasonable the proposals in the Draft TMDL and Draft WIP that would mandate major increases in Phase I MS4 restoration/retrofit and the establishment of similar requirements for Phase II MS4 permittees.

SWAM respectfully requests that EPA and the State each conduct thorough cost and cost-benefit, and affordability analyses before adopting a final TMDL or WIP with restoration/retrofit requirements beyond current permit requirements

Finally, SWAM requests that EPA and the State work closely with localities to define a reasonable approach and manageable level-of-effort that is affordable at the household level.

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[9] The Next Generation of Tools and Actions to Restore Water Quality in the Chesapeake Bay: A Revised Report Fulfilling Section 202a of Executive Order 13508 (Nov. 24, 2009).

[10] See Appendix 1.

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APPENDIX: 1

CDM

Technical Memorandum

To: *Virginia Municipal Stormwater Association (VAMSA)*
Christopher D. Pomeroy, Esq., AquaLaw PLC

From: *David Mason, P.E., D.WRE*
Christopher W. Tabor, P.E.

Date: *October 12, 2010*

Subject: *Stormwater Retrofit Cost Estimate Case Study*

As EPA and the Commonwealth of Virginia develop their Chesapeake Bay TMDL and Watershed Implementation Plan (WIP), respectively, to address pollutant concerns in the Chesapeake Bay, a consideration of the potential cost impacts related to stormwater for localities and their citizens is appropriate but has generally been omitted to date. This memorandum summarizes approaches to attempt to estimate the cost for implementation of stormwater retrofits to comply with the EPA Draft TMDL for the Chesapeake Bay (September 24, 2010). It should be noted that site specific conditions, technologies, and local regulations may affect the application of this cost analysis. Therefore, a variety of methods and associated range of costs is provided for consideration and planning purposes. Using these methods described below, EPA's Draft Bay TMDL is estimated to have an Annual Per Household Cost Impact in the range of $678 per year per household initially up to a potential maximum impact of $1,717 per year per household in 2025.

1.0 Calculation Methodology

As the TMDL is in "draft" form and errors/unknowns in the Bay model and input data may exist, this technical memorandum estimates the cost impacts using a variety of methods in an effort to provide a range of costs. The following sections summarize the assumptions used for each calculation method:

Method 1 – Analysis of Cost by Treated Acres

The first method used to estimate the stormwater retrofit/treatment cost involves the application of unit costs (based on treated area) to specific areas as defined by Virginia and EPA within the draft Virginia WIP and draft EPA TMDL. The following subsections describe the cost evaluation and estimate of treatment area:

Unit Cost Assumptions

A literature search was performed to determine estimated costs for pollutant reduction. One of the most common costs listed for the subject matter includes the cost to treat a unit of area (e.g, per acre, etc). It is anticipated that high-efficiency, BMP retrofits will be required to meet the reduction goals set forth by the State and EPA in the respective documents. The Center for Watershed Protection (2007) reports an average construction cost of approximately $88,000 per impervious acre (or, approximately $90,000 in 2010 dollars) to treat for pollutant removal using higher efficiency BMPs. Treatment of pervious land is less costly and has been estimated to be approximately $4,100 per pervious acre (2010 dollars). These costs can be applied to the treatment area in any locality to determine a planning level cost for pollutant reduction.

It has been assumed that full delivery cost is approximately 50% higher to account for engineering, design, permitting and contingency of such projects, bringing the cost to approximately $135,000 per impervious acre and $6,150 per pervious acre (each in 2010 dollars).

Treatment Area Determination

The draft TMDL released by EPA proposes aggressive performance standards to meet the urban stormwater load reduction targets. Page 9 of the Executive Summary of the Draft Chesapeake Bay TMDL summarizes the assumptions related to nutrient reduction in MS4 areas, including proposed treatment for 50 percent of urban MS4 lands through retrofit/ redevelopment and treatment for 50 percent of unregulated land treated as regulated (thus suggesting a 25 percent treatment of unregulated land). Based on a review of the model, "regulated lands" are noted as a combination of "high intensity impervious", "high intensity pervious" and "combined sewer system" areas. "Non-regulated lands" are a combination of "low intensity impervious" and "low intensity pervious." It is stated that these assumptions are the basis of an E3 scenario, which has been defined as "everything, everywhere by everyone."

The latest available model runs from EPA dated 09/17/10 list the total acres assumed for each locality. For this case study, the City of Lynchburg areas were used to represent a typical community in Virginia. Table 1 summarizes the urban acres for Lynchburg.

Table 1 – Urban Land Use Breakdown for Lynchburg

Land Use	Designation	Urban Acres	% Treated	Treated Acres
High Intensity Impervious	Regulated	1,645	50%	823
Low Intensity Impervious	Unregulated	0	25%	0
Combined Sewer System	Regulated	3,526	50%	1,763
High Intensity Pervious	Regulated	7,208	50%	3,604
Low Intensity Pervious	Unregulated	752	25%	188
Total		**13,131**	**n/a**	**6,378**

The unit cost factors previously provided were applied to each respective land use category (impervious or pervious). For the Combined Sewer System area, a breakdown of the percentage of pervious and impervious is not provided. CDM assumed an equal split of the two areas for cost determination. Refer to Section 2.0 for the cost summary.

Method 2 – Analysis of Cost by Pollutant Reduction

A second method for used to estimate the stormwater retrofit/treatment cost is an evaluation of the cost to remove a unit weight or volume of a pollutant. The following sections summarize the assumptions used to generate a retrofit cost for this method.

Unit Cost Assumptions

Total nitrogen (TN) and/or total phosphorus (TP) are significant pollutants of concern for the Bay. The unit costs are typically reported in dollars ($) per pound removed. Similar to the first method, research and literature shows varying levels of cost for pollutant reduction. Documented costs for completed retrofit projects designed to specifically treat nutrients were compiled to form the basis for this method. The State of Florida Department of Environmental Projection (FDEP) tracks the pollutant removal costs of all projects the receive State Revolving Loan funds. The State has summarized the costs for over 40 projects at the link provided herein: http://www.dep.state.fl.us/water/watersheds/docs/tmdl-grant-nutrient-costs-0210.pdf.

For the purposes of this work, the following assumptions were made regarding the FDEP data:

- TN removal was assumed to require the greatest level of effort, and was used as the basis for calculating nutrient removal costs.
- Of the 40 data points in the table, the top and bottom 10th percentile values were screened out in order to remove the potential for outlier data points.

- To account for the potential difference in cost when comparing BMPs in Florida soils versus soils in Virginia, only the top half of the remaining data points were used to compute average cost values.
- The average cost for TN removal is $8,036 lb/yr.
- Since the FDEP costs consider full design and implementation, no premium was added to these values.

Pollutant Removal Determination

The Chesapeake Bay TMDL model run output spreadsheets include both baseline (assumed 2009 Progress) and target load allocations for individual municipalities. The most recent E3-based load allocations can be found in the model run dated September 17, 2010. Table 3 summarizes total nitrogen baseline loadings and E3 target load reductions for Lynchburg.

Table 3 – Target TN Load Reductions for E3-based Scenario

Baseline Loadings (lbs/yr)	Edge of Stream TN(lbs/yr)
Impervious	20,607
Pervious	73,932
Total	**94,539**
Reduction (Lbs/yr)	**Edge of Stream TN (lbs/yr)**
Impervious	8,379
Pervious	32,227
Total	**40,606**
Reduction (%)	**Edge of Stream TN (% removal)**
Impervious	40.7%
Pervious	43.6%
Total	**43.0%**

The estimated cost on a pounds per year basis defined above for TN was applied to the TN reduction target in Table 3 to estimate the total retrofit cost for TMDL compliance. The cost for this method is reported in Section 2.0 in comparison to the other calculation methods described herein.

Method 3 - Analysis of Cost by BMP Implementation

The third method used to estimate the stormwater retrofit/treatment cost is based on the potential number of BMPs required to achieve the required pollutant load reductions. The following sections summarize the BMP cost analysis and application of BMPs to Lynchburg.

Unit Cost Assumptions

For the third method of this work, it was assumed that traditional stormwater wet ponds would be used to provide the treatment necessary for the target nitrogen load reduction. Wet ponds are the most common and least cost BMP for treating nutrients in any soil condition, and our estimated cost represents a baseline planning level cost. Actual implementation depends on watershed, locality, site specific conditions and could be higher than these planning level costs if other types of BMPs are needed due to constraints.

It was assumed that semi-regional ponds would be installed as retrofits and serve 25-acres each. Wossink and Hunt (2003) provide standard equations for determining the construction cost of typical BMPs based on area treated. For a stormwater wet pond, the following equation was used to estimate the total construction cost:

$$\text{Cost (in 2003 dollars)} = 13{,}909 \times DA^{0.672}, \text{ where DA = drainage area in acres}$$

The cost was computed in 2010 dollars using an annual inflation rate of 4%. In addition, literature suggests that the cost for a retrofit BMP versus a new BMP ranges from 1.5 to 4 times the new construction cost. Therefore, a factor of two was applied to the cost calculated in 2010 dollars. Finally, the standard factor of 50% was applied to account for design, engineering, permitting and contingency cost. The estimated cost (in 2010 dollars) to construct a retrofit, stormwater wet pond that treats 25 acres is $477,000.

Wet Pond Implementation Determination

Per the previous section, 40,606 lbs/yr is the targeted load reduction necessary to meet the E3-based scenario for Lynchburg. Several assumptions are required in order to determine the total number of wet ponds necessary to achieve the targeted load reductions. The following list describes these assumptions:

- Based on a review of the model runs, the "No Action" pollutant loading rate for TN is assumed to be approximately 10 lbs/ac/yr.
- If the pond is assumed to treat 25 acres, then the pollutant load delivered to each pond is 250 lbs/yr.
- Supporting documentation for the model input states that wet detention ponds have a removal efficiency of 20 percent. When applied to the 250 lbs/yr, each wet pond serving 25 acres can remove approximately 50 lbs/yr of TN.

- If a reduction of 40,606 lbs/yr is the target, then approximately 810 wet detention ponds are required to achieve the total reductions.

The total number of ponds required to meet the reduction goals can be multiplied by the cost per wet pond defined above to calculate the total cost of BMP implementation. This cost will be defined and compared to the two previous methods in the Section 2.0.

It should be noted that 810 wet detention ponds would treat approximately 20,250 acres (810 x 25 acres/pond). While Table 1 shows only the urban acres at 13,131 acres, the total acreage for Lynchburg is 32,000 so this method is feasible in theory. However, further evaluation on land availability and acquisition opportunities would have to be performed at the local level to determine the true cost of implementation.

2.0 Total Cost Comparison

As a case study, the three calculation methods above were applied to Lynchburg data that resides in the Chesapeake Bay TMDL model. These multiple approaches were attempted to validate that the process was sound and has the potential to be applied elsewhere within the State. Table 4 presents a summary of the estimated total construction cost (including design, engineering and permitting considerations) to achieve the targeted loads listed in the model runs for Lynchburg. Ongoing operation and maintenance (O&M) cost of the new BMP facilities should also be considered. For this, a standard literature value of five percent of the capital construction costs is used to estimate annual O&M costs, which is then totaled for the 15 year planning period assumed for Bay TMDL compliance. The total O&M cost for the 15-year period is also provided in Table 4.

Table 4 - Planning Level Estimate of BMP Retrofit Costs for Lynchburg, VA based on EPA Draft Chesapeake Bay TMDL (in 2010 dollars)

Method	Total Capital ($)	Total O&M ($)	Total Cost ($)
1 – Cost By Treated Acres	$ 259,000,000	$ 91,000,000	$ 350,000,000
2 – Cost By Pollutant Reduction	$ 326,000,000	$ 114,000,000	$ 440,000,000
3 – Cost by BMP Implementation	$ 386,000,000	$ 135,000,000	$ 521,000,000

Based on the assumptions provided herein, the range of total capital costs for Lynchburg is approximately $259 million to $386 million for full implementation of BMP retrofits through 2025 (15-year planning period).

It is important to note that the capital costs indicated do <u>not</u> include master planning costs and any costs/fees associated with land acquisition, land attainment, transfer of land

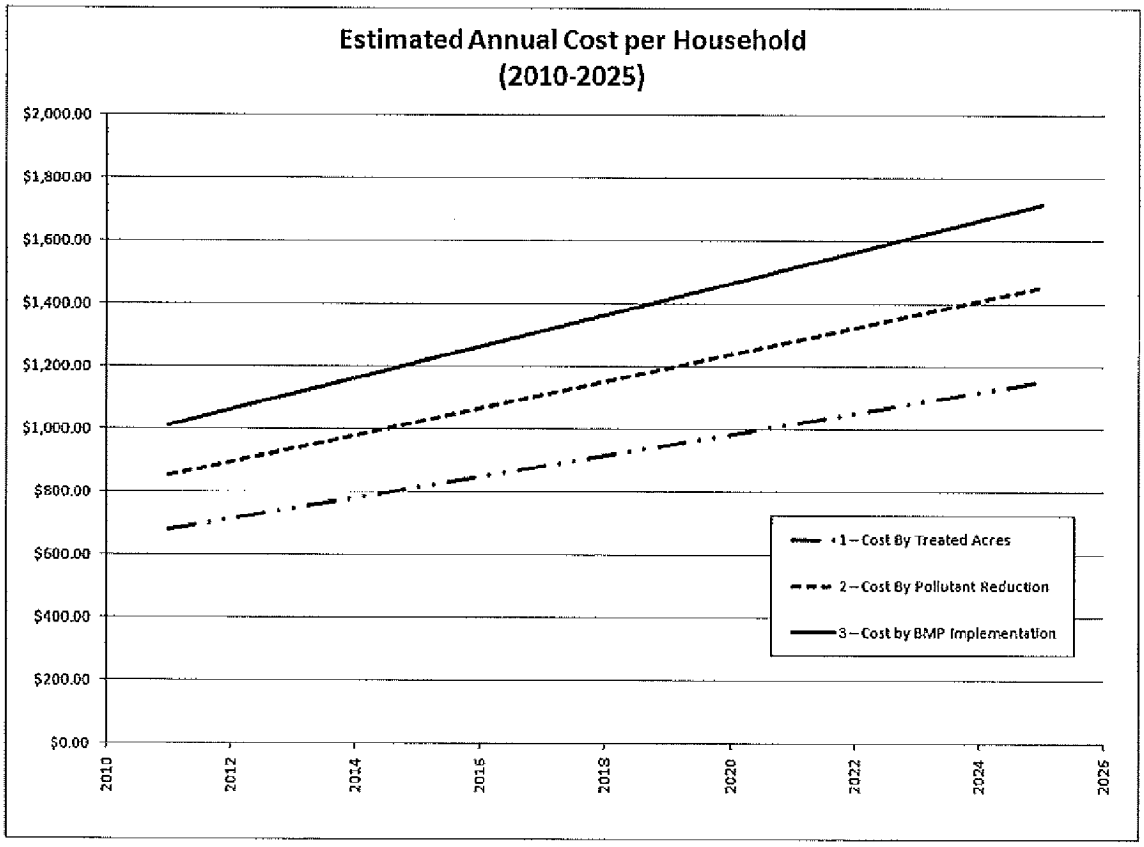
ownership, etc. associated with wide implementation of various BMPs across the locality. Therefore, land costs (such as acquisition costs for some or all of the 810 wet pond sites) would increase the capital costs presented herein.

It should also be noted that capital costs on this order of magnitude would typically be bonded and the debt service paid over time, so the financial burden shown in the table above should not be interpreted as requiring upfront lump sum investment. Section 3.0 graphically depicts a possible scenario that Lynchburg may experience on an annual basis.

3.0 Estimated Cost per Household/Person Annually

As a final evaluation in this case study, CDM estimated the potential cost on a household basis and a per person basis for the City of Lynchburg based on 2009-2010 US Census Bureau data (73,933 population and 25,477 households). The following charts assume that capital costs for BMP implementation are normalized each year and that over time O&M costs will increase per year due to more BMPs being in service each year. In summary, costs per household per year range from a low of $678/year initially up to a potential maximum of $1,717/year in 2025 depending on the methodology used and the annual O&M costs.

Chart 1 -Estimated Annual Cost per Household (2010 dollars)



When evaluating the cost by population, the costs per person per year range from a low of $234/year initially to a potential maximum of $592/year in 2025 depending on the methodology used and the annual O&M costs.

Chart 2 -Estimated Annual Cost per Person (2010 dollars)